FCC Part 74 Subpart H
EMI TEST REPORT
of

E.U.T. : UHF Pendant transmitter
FCC ID. : 2AA9S-SIMEON5T
Model No. : Simeon 5T
Working Frequency : 640-664 MHz

for

APPLICANT : Supportive Hearing Systems Inc.
ADDRESS : 283 MacPherson Avenue Toronto, Ontario M4V 1A4, Canada

Test Performed by

ELECTRONICS TESTING CENTER (ETC) , TAIWAN
NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,
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Report Number : 13-09-RBF-038-01

TEST REPORT CERTIFICATION

Applicant	:	Supportive Hearing Systems Inc. 283 MacPherson Avenue Toronto, Ontario M4V 1A4, Canada
Manufacturer	:	OKAYO ELECTRONICS CO., LTD. No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan
Description of EUT	:	
a) Type of EUT	:	UHF Pendant transmitter
b) Trade Name	:	Simeon
c) Model No.	:	Simeon 5T
d) FCC ID	:	2AA9S-SIMEON5T
e) Working Frequency	:	640~664 MHz
f) Power Supply	:	3.7 V Li-ion.1200 mAh rechargeable battery Adapter Model：STD-05010U Input：100-240Vac, 47-63Hz, 0.19A MAX Output：5.0Vdc, 1.0A, 5.0W MAX

Regulation Applied: FCC Rules and Regulations Part 74 Subpart H

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Issued Date : Dec. 18, 2013

Test Engineer : Vincent Chang
(Vincent Chang, Engineer)

Approve & Authorized Signer : S. S. Liou
S. S. Liou, Section Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	:	UHF Pendant transmitter
b) Trade Name	:	Simeon
c) Model No.	:	Simeon 5T
d) FCC ID	:	2AA9S-SIMEON5T
e) Working Frequency	:	640~664 MHz
f) Power Supply	:	3.7 V Li-ion.1200 mAh rechargeable battery Adapter Model：STD-05010U Input：100-240Vac, 47-63Hz, 0.19A MAX Output：5.0Vdc, 1.0A, 5.0W MAX
g) Emission Designator	:	148K F3E 2M+2DK=2x(4kHz)+2x(70kHz)x1=148kHz

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2003). Test also follow “TIA-603-C(2004)-Land Mobile FM or PM Communications Equipment Measurement and Performance Standsrds” and section 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, and 2.1055 of Part 2 of CFR 47.

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Dingfu Vil., Linkou Dist., New Taipei City, Taiwan 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Jun. 11, 2011.

2. REQUIREMENTS OF PROVISIONS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Frequencies Available

According to sec. 74.802 of Part 74, the following frequencies are available for low power auxiliary station :

Frequencies (MHz)

26.100-26.480	455.000-456.000
54.000-72.000	470.000-488.000
76.000-88.000	488.000-494.000
161.625-161.775	494.000-608.000
174.000-216.000	614.000-806.000
450.000-451.000	944.000-952.000

2.3 Requirements for Radio Equipment on Certification

(1) RF Output Power
For transmitters, the power output shall be measured at the RF output terminals.

(2) Modulation Characteristics
For Voice Modulated Communication Equipment, a curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

(3) Occupied Bandwidth
For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

(4) Spurious Emissions at Antenna Terminals
The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

(5) Field Strength of Spurious Emissions

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation.

(6) Frequencies Tolerance

a) The frequency stability shall be measured with variation of ambient temperature.
b) The frequency stability shall be measured with variation of primary supply voltage.

2.4 Labeling Requirement

Each equipment for which a type acceptance application is filed on or after May 1,1981, shall bear an identification plate or label pursuant to §2.925（Identification of equipment） and §2.926（FCC identifier）.

3. OUTPUT POWER MEASUREMENT

3.1 Provision Applicable

According to §74.861(e)(1)(ii), the output power shall not exceed 250 milliwatts.

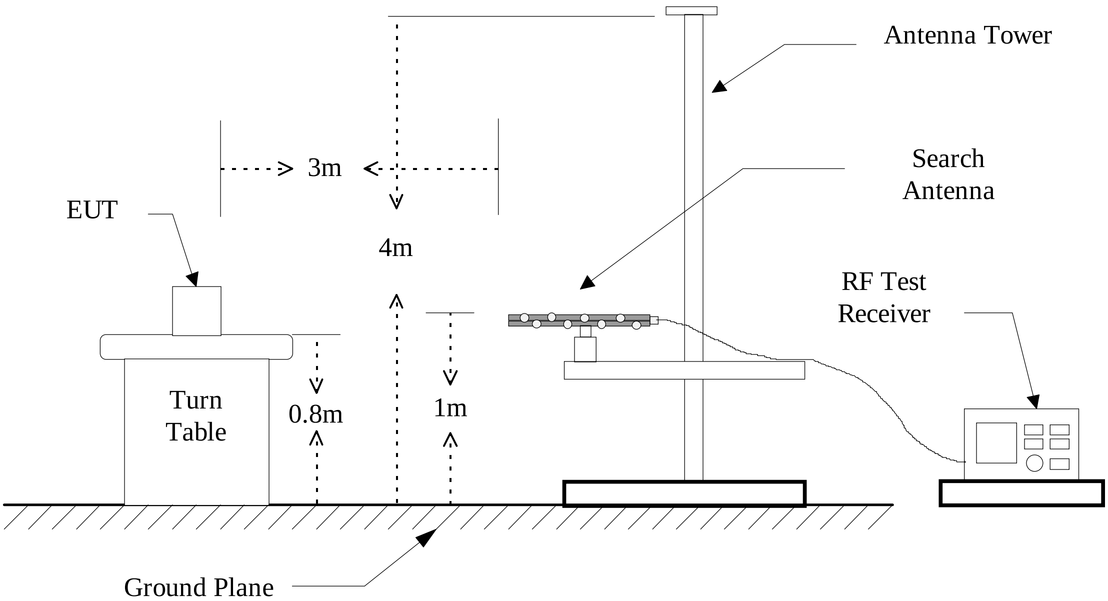
3.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° , and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.

7. Repeat step 6 until all frequencies need to be measured were complete.

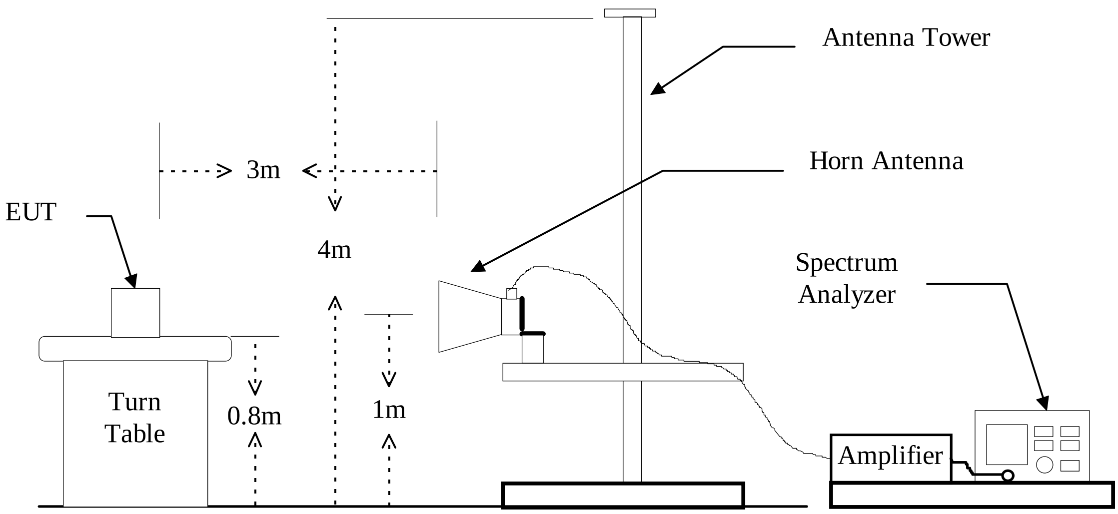
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

Figure 1 : Frequencies measured below 1 GHz configuration



Note: For substitution method, replace the EUT with a tuned dipole antenna relative to each frequency and connect to a standard signal generator (SG) via a low loss cable.

Figure 2 : Frequencies measured above 1 GHz configuration



Note: For substitution method, replace the EUT with a horn antenna and connect to a standard signal generator (SG) via a low loss cable.

3.3 Test Data

Band 640 – 664MHz

Operated mode : TX   Test Date : Dec. 02, 2013

Temperature : 20 °C   Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
640.1	83.1	12.0	2.4	----	9.6	9.120	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
652.1	82.9	11.4	2.4	----	9.1	8.128	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
663.9	82.3	11.9	2.3	----	9.4	8.710	250

Note: For measured frequency below 1GHz, a tuned dipole antenna is used.

3.4 Result Calculation

Result calculation is as following :

Result ＝ SG Reading ＋Cable Loss ＋Antenna Gain Corrected

Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.

$$mW = \log^{-1}\left[\frac{\text{Result(dBm)}}{10}\right]$$

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2013/05/14	2014/05/13
Dipole Antenna	Schwarzbeck	897;898	2013/09/07	2014/09/07
Log-periodic Antenna	EMCO	3146	2013/10/16	2014/10/15
Amplifier	HP	8447D	2013/05/03	2014/05/02
Signal generator	HP	83732B	2013/09/05	2014/09/04

4. MODULATION CHARACTERISTICS

4.1 Provisions Applicable

According to § 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

4.2 Measurement Method

A) Modulation Limit

1. Position the EUT as shown in figure 3, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.

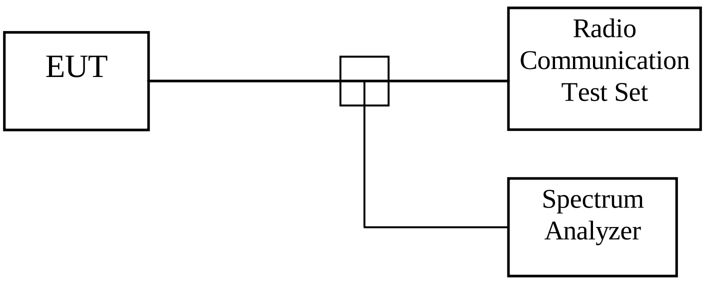
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

B) Frequency response of all circuits

1. Position the EUT as shown in figure 3.

2. Vary the modulating frequency from 100 Hz to 15000 Hz with constant input voltage (derived from 5.4(a) of this test report), and observe the change in output.

Figure 3 : Modulation characteristic measurement configuration



4.3 Measurement Instrument

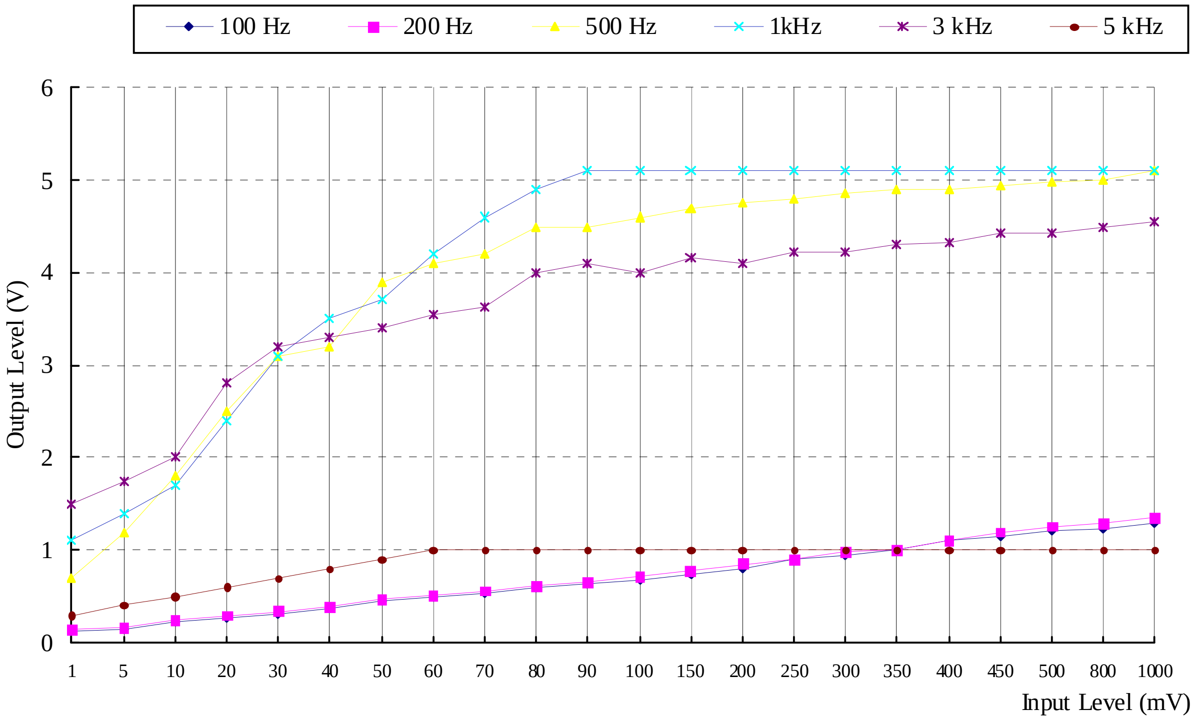
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX	2945B	2013/05/13	2014/05/12
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

4.4 Measurement Result

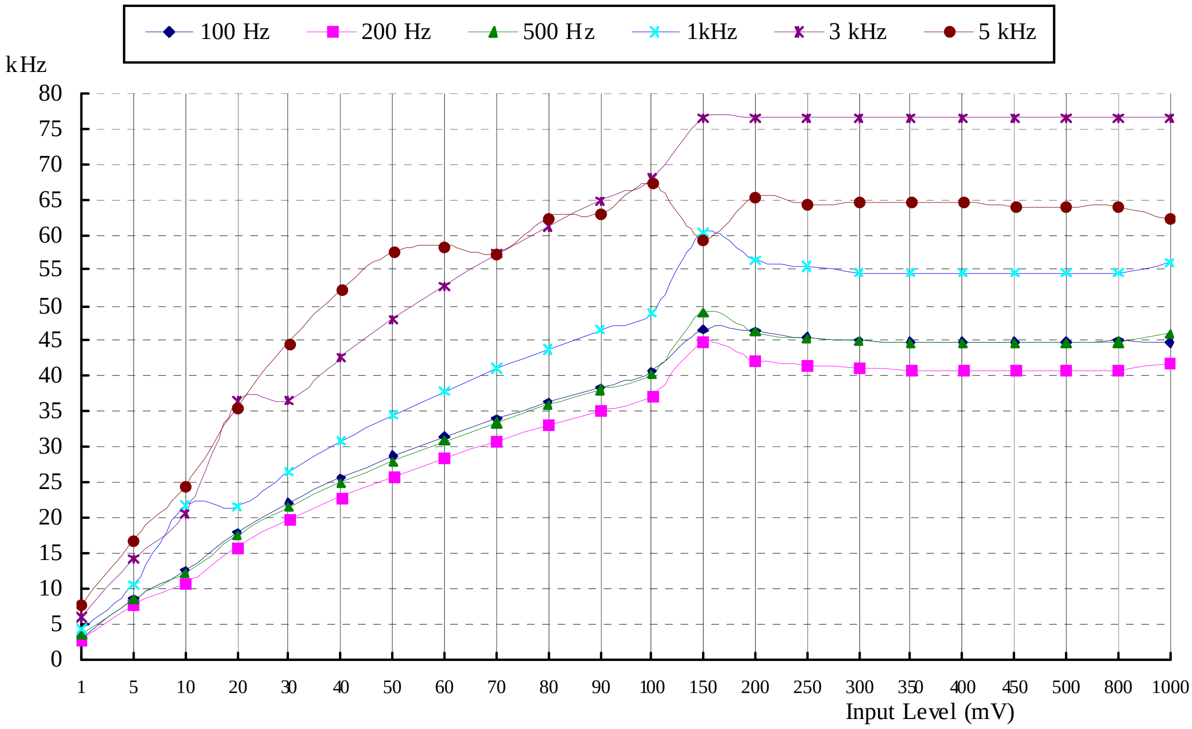
RF Frequency : 640.1MHz;

Test Date : Dec. 02, 2013 Temperature : 20 °C Humidity : 65 %

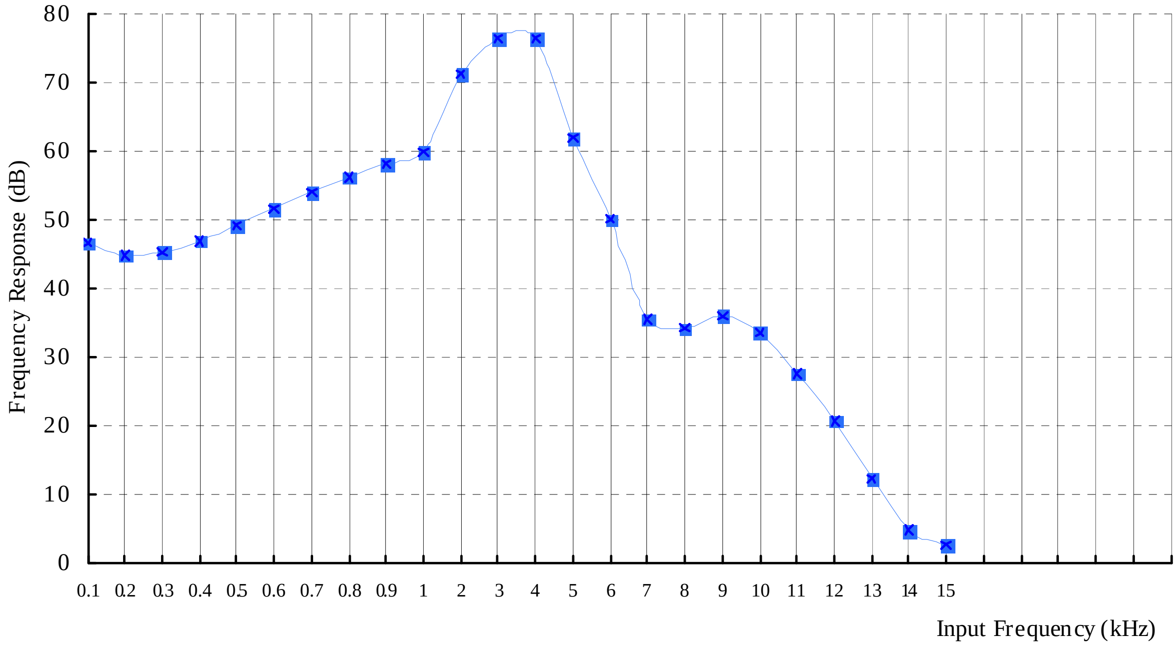
A). Frequency response



B). Modulation Limit



C). Frequency response of all circuits



5. OCCUPIED BANDWIDTH OF EMISSION

5.1 Provisions Applicable

According to §2.1049 (c)(1), For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.
According to §74.861(e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

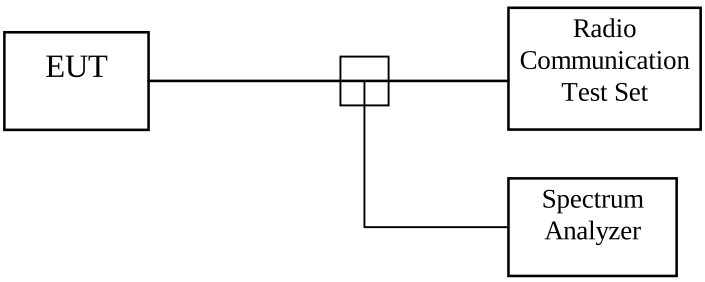
5.2 Measurement Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT as shown in figure 4, and Install new batteries in the EUT. Turn on the EUT ant set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Apply a 2.5 kHz modulation signal to EUT and measure the frequencies of the modulated signal from the EUT where it is the specified number of dB below the reference level set in step 2. This is the occupied bandwidth specified.

Figure 4 : Occupied bandwidth measurement configuration



5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX	2945B	2013/05/13	2014/05/12
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

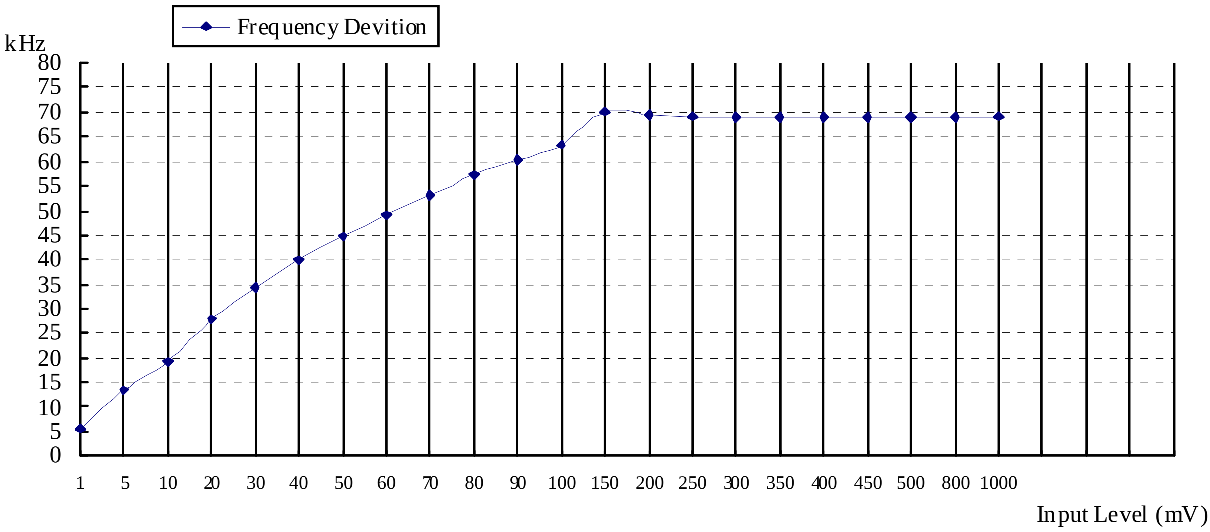
5.4 Bandwidth Measured

5.4.1 Input Level Derived

RF Frequency : 640-664MHz;

Test Date : Dec. 02, 2013 Temperature : 20 °C Humidity : 65 %

Input Audio Frequency : 2.5 kHz, Sine Wave

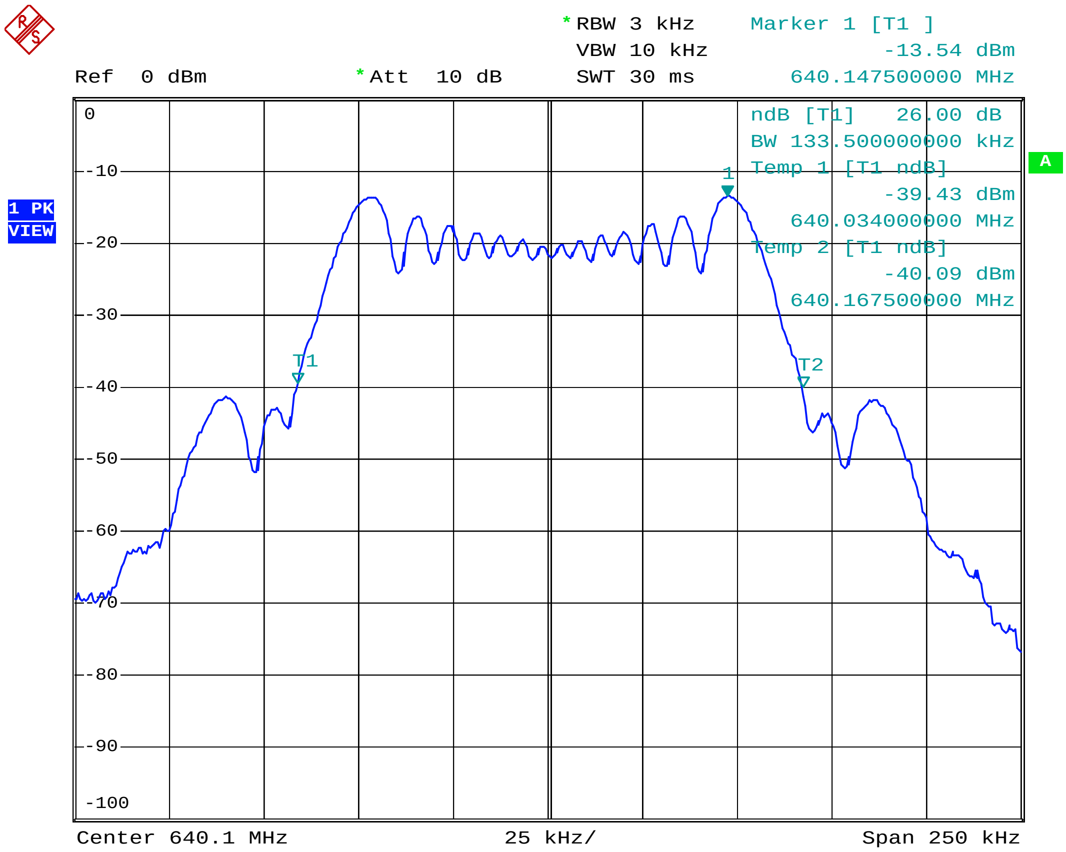


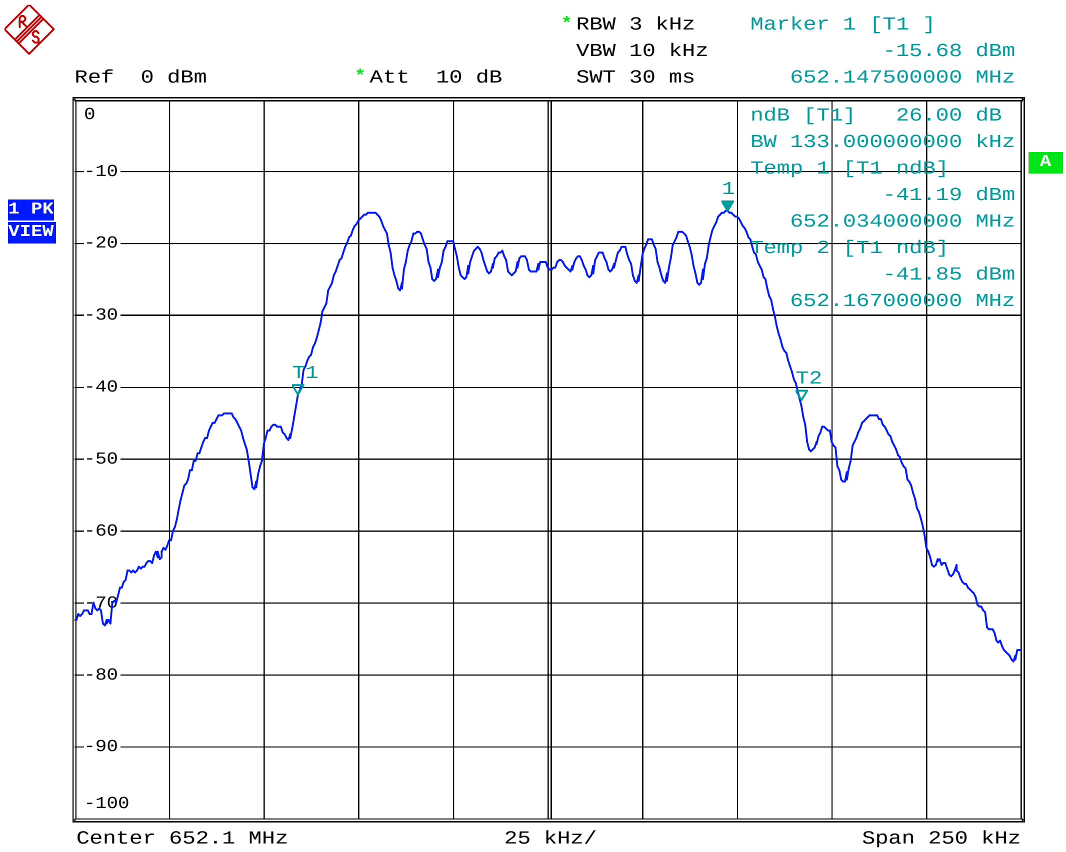
The Level input to produce 50% modulation is 75 mV, therefore the magnitude 16 dB greater than it is 473.151 mV.

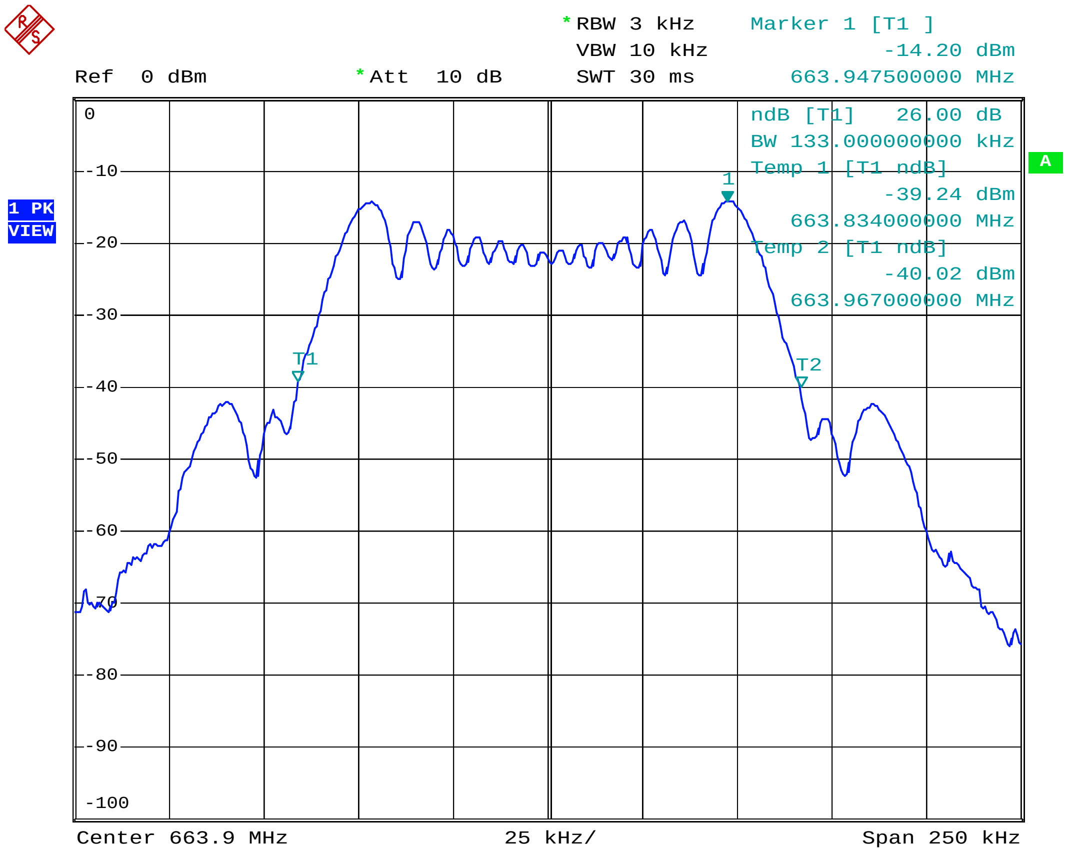
5.4.2 Occupied Bandwidth Plotted

Test Date : Dec. 02, 2013 Temperature : 20 °C Humidity : 65 %

RF Frequency (MHz)	26 dB Bandwidth (kHz)
640.1	133.5
652.1	133
663.9	133


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Ref 0 dBm
*Att 10 dB
Marker 1 [T1]
-13.54 dBm
640.147500000 MHz
ndB [T1] 26.00 dB
BW 133.500000000 kHz
Temp 1 [T1 ndB]
-39.43 dBm
640.034000000 MHz
Temp 2 [T1 ndB]
-40.09 dBm
640.167500000 MHz
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
T1
T2
Center 640.1 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
-15.68 dBm
652.147500000 MHz
Ref 0 dBm
*Att 10 dB
ndB [T1] 26.00 dB
BW 133.000000000 kHz
Temp 1 [T1 ndB]
-41.19 dBm
652.034000000 MHz
Temp 2 [T1 ndB]
-41.85 dBm
652.167000000 MHz
1 PK VIEW
A
Center 652.1 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
Marker 1 [T1]
VBW 10 kHz
-14.20 dBm
Ref 0 dBm
*Att 10 dB
SWT 30 ms
663.947500000 MHz
ndB [T1] 26.00 dB
BW 133.000000000 kHz
Temp 1 [T1 ndB]
-39.24 dBm
663.834000000 MHz
Temp 2 [T1 ndB]
-40.02 dBm
663.967000000 MHz
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
T1
T2
1
Center 663.9 MHz
25 kHz/
Span 250 kHz

6. FIELD STRENGTH OF EMISSION

6.1 Provisions Applicable

According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the follwing sceedule:

(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.

(ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.

(iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

6.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in chapter 3.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360°, and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.

7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

6.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Log-periodic Antenna	EMCO	3146	2013/10/16	2014/10/15
Biconical Antenna	EMCO	3110	2013/10/16	2014/10/15
Dipole Antenna	Schwarzbeck	897;898	2013/09/07	2014/09/07
Amplifier	HP	8449B	2013/01/09	2014/01/08
Amplifier	HP	8447D	2013/05/03	2014/05/02
Signal generator	HP	83732B	2013/09/05	2014/09/04

Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

6.4 Measuring Data

6.4.1. Emission Test Data

a. Tx Frequency: 640.1MHz

Operated mode : TX Test Date :Dec. 02, 2013
Temperature : 20 °C Humidity : 65 %

Unmodulated carrier output power is 9.6 dBm , or 9.120 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.6-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1280.200	---	---	---	---	6.4	-2.0	1.30	---	---	-13.0	---
1920.300	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2560.400	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3200.500	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3840.600	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4480.700	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
5120.800	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5760.900	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6401.000	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result ＝ SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

b. Tx Frequency: 652.1 MHz

Operated mode : TX Test Date :Dec. 02, 2013
Temperature : 20 °C Humidity : 65 %

Unmodulated carrier output power is 9.1 dBm , or 8.128 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.1-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1304.200	---	---	---	---	6.4	-2.0	1.30	---	---	-13.0	---
1956.300	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2608.400	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3260.500	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3912.600	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4564.700	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
5216.800	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5868.900	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6521.000	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

Note :

1. Remark “---“ means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result ＝ SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

c. Tx Frequency: 663.9MHz

Operated mode : TX   Test Date :Dec. 02, 2013
Temperature : 20 °C   Humidity : 65 %

Unmodulated carrier output power is 9.4 dBm , or 8.710 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.4-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr’	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1327.800	---	---	---	---	6.4	-2.0	1.30	---	---	-13.0	---
1991.700	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2655.600	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3319.500	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3983.400	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4647.300	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
5311.200	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5975.100	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6639.000	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

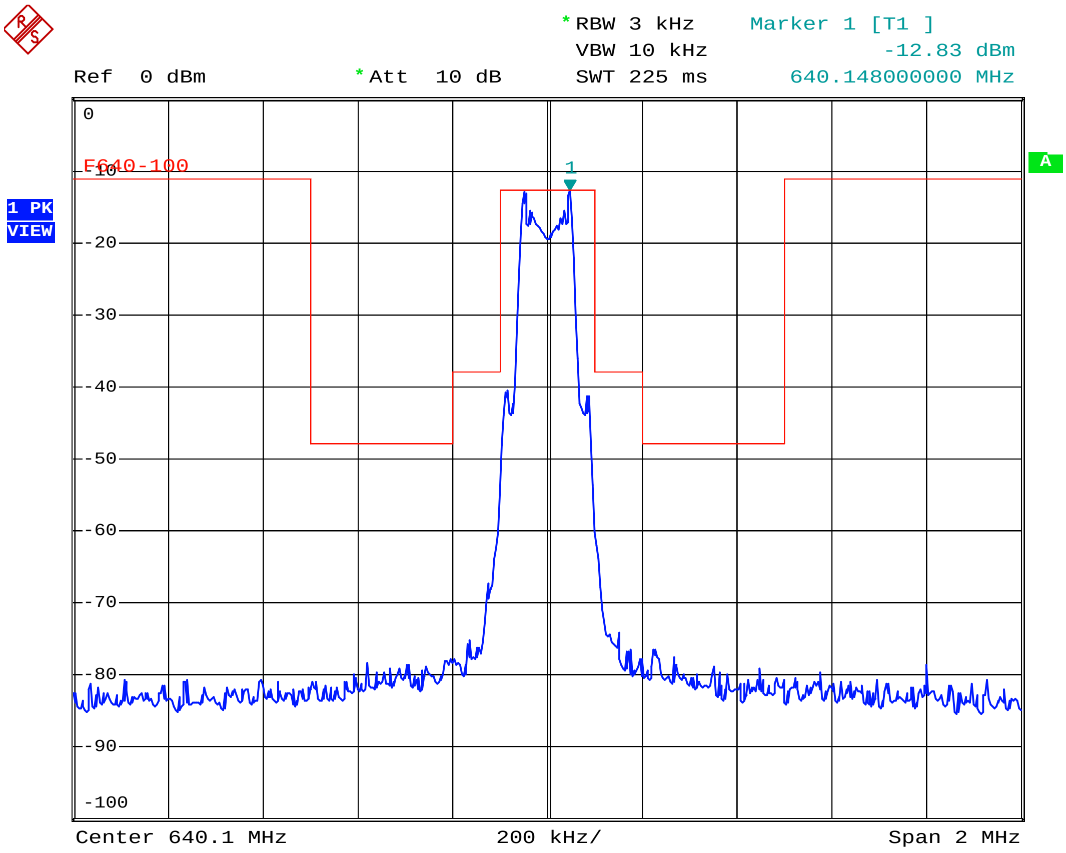
Note :

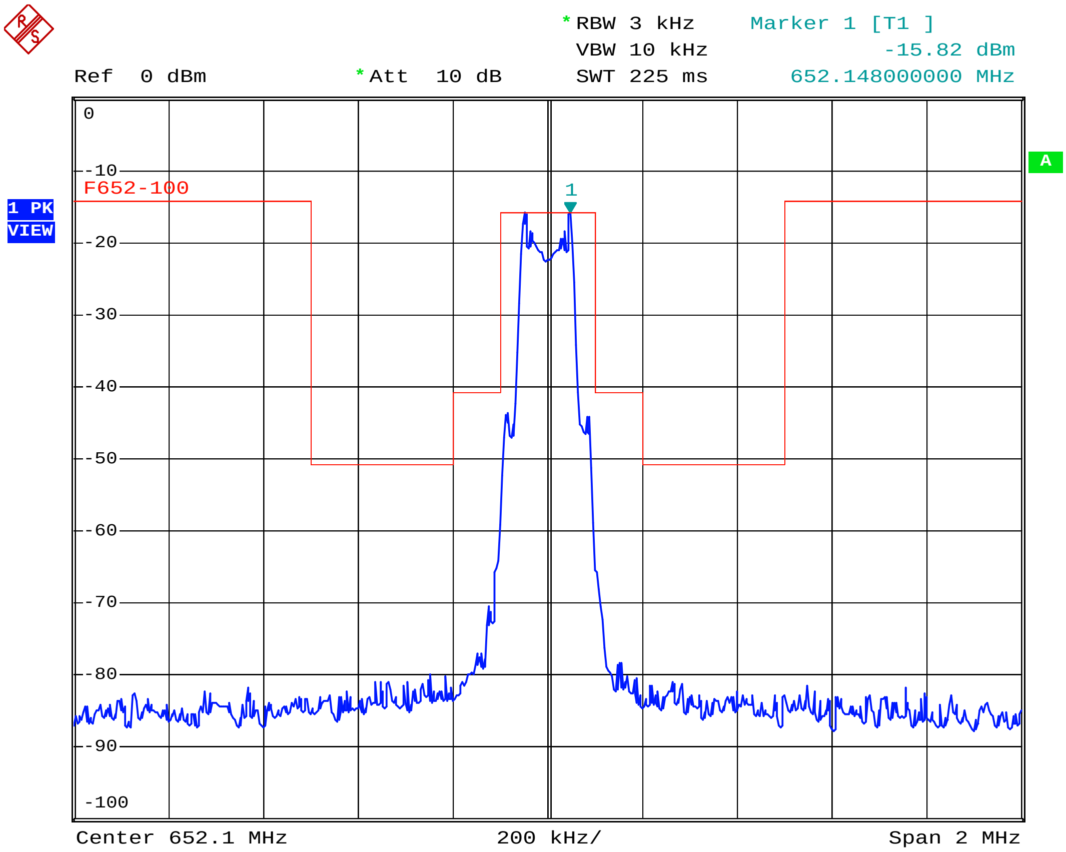
1. Remark “---“ means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

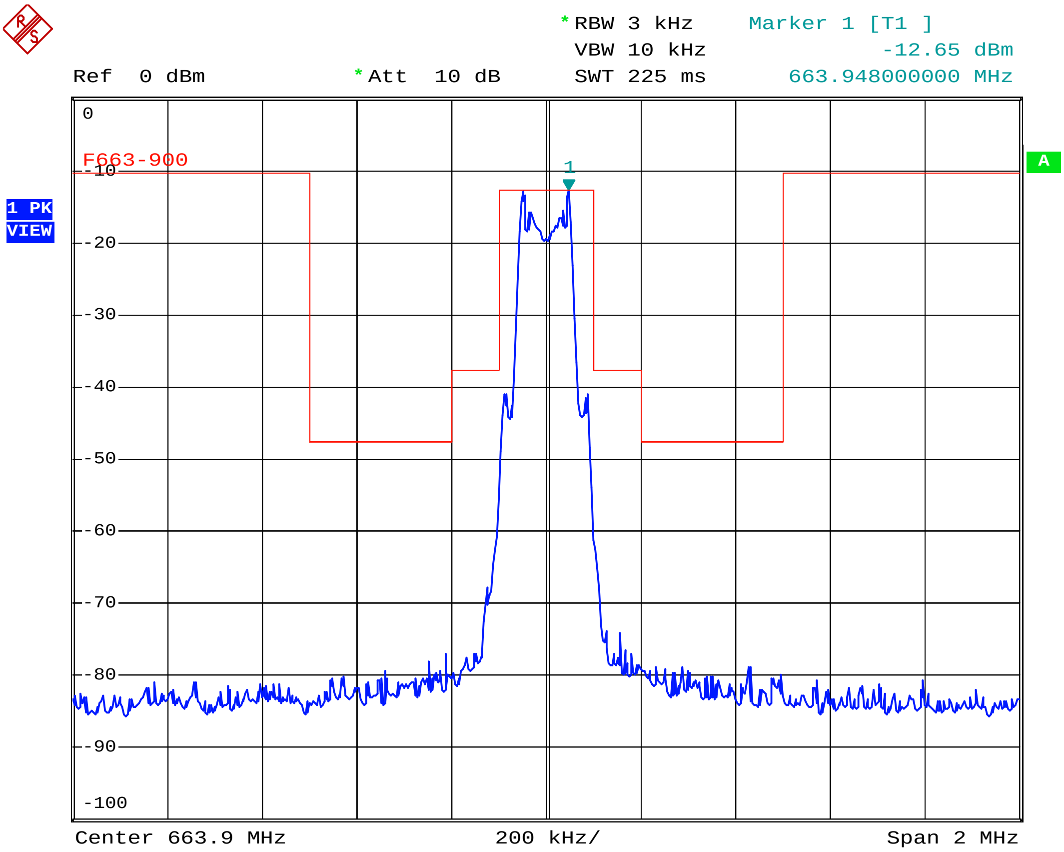
   Result ＝ SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

6.4.2 Emission mask plots




*RBW 3 kHz
Marker 1 [T1]
VBW 10 kHz
-15.82 dBm
Ref 0 dBm
*Att 10 dB
SWT 225 ms
652.148000000 MHz
F652-100
1 PK
VIEW
A
Center 652.1 MHz
200 kHz/
Span 2 MHz


*RBW 3 kHz
VBW 10 kHz
SWT 225 ms
Marker 1 [T1]
-12.65 dBm
663.948000000 MHz
Ref 0 dBm
*Att 10 dB
1 PK
VIEW
F663-900
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
Center 663.9 MHz
200 kHz/
Span 2 MHz

6.5 Other Emission

a) Emission frequencies below 1 GHz

Mode：Charge & Operation Mode

Test Date : Dec. 02, 2013 Temperature : 20 °C Humidity : 65 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
37.15	V	4.4	14.0	18.4	40.0	-21.6	182	1.0
115.23	V	8.1	12.1	20.2	43.5	-23.3	190	1.0
138.19	V	7.7	13.6	21.3	43.5	-22.2	177	1.0
158.62	V	7.4	14.1	21.6	43.5	-21.9	184	1.0
175.88	V	7.6	14.8	22.4	43.5	-21.1	175	1.0
188.92	V	6.4	16.2	22.6	43.5	-20.9	191	1.0

Note :

1. *Remark “---” means that the emissions level is too low to be measured.*
2. *The expanded uncertainty of the radiated emission tests is 3.53 dB.*

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

6.6 Radiated Measurement Photos

Test Mode:Single

Test Mode:Charge

7. FREQUENCY STABILITY MEASUREMENT

7.1 Provisions Applicable

According to §2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃to +50℃centigrade, and according to §2.1055 (d)(2), the frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

According to §74.861(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

7.2 Measurement Procedure

A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used.

2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃decreased per stage until the lowest temperature -30℃is measured, record all measurement frequencies.

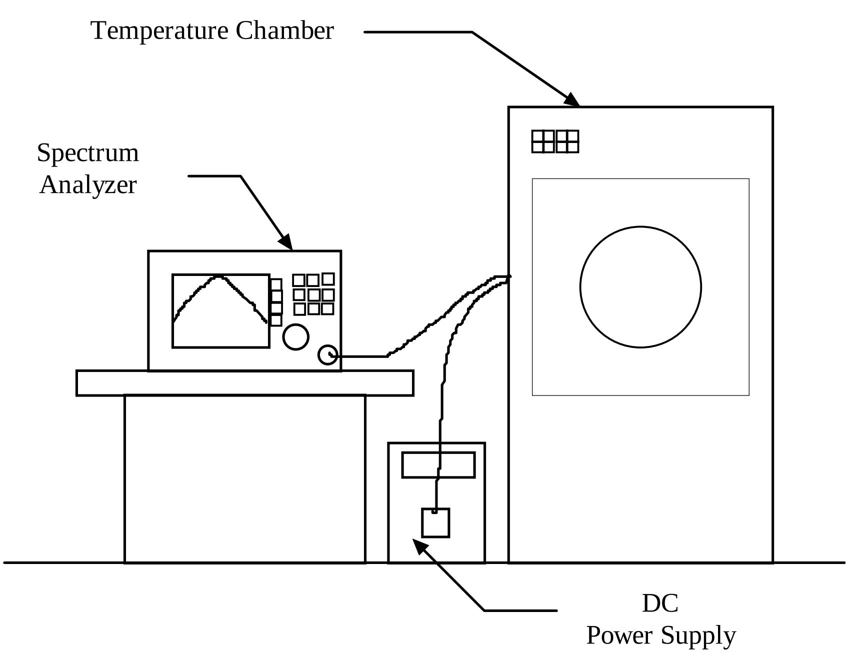
B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used. Install new batteries in the EUT.

2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. For non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06
Temperature Chamber	MALLIER	MCT-2X-M	2013/05/02	2014/05/01

7.4 Measurement Data

Test Date : Dec. 03, 2013　　Temperature : 22 °C　　Humidity : 60 %

A. Tx Frequency 640.1MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency :640.1 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.7Vdc	640.0890	-0.00171	640.1237	0.00370	640.0970	-0.00047
40		640.0803	-0.00308	640.1211	0.00330	640.1011	0.00018
30		640.0773	-0.00355	640.1164	0.00257	640.0825	-0.00274
20		640.1026	0.00040	640.1140	0.00219	640.1167	0.00261
10		640.0869	-0.00205	640.0909	-0.00142	640.0976	-0.00037
0		640.1082	0.00128	640.0812	-0.00293	640.0863	-0.00214
-10		640.0822	-0.00278	640.0947	-0.00083	640.0969	-0.00049
-20		640.0818	-0.00285	640.1051	0.00079	640.0869	-0.00205
-30		640.0965	-0.00055	640.0758	-0.00378	640.1015	0.00024

A2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 640.1 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	3.145	640.1168	0.00263	640.0765	-0.00367	640.0939	-0.00096
25	4.255	640.0971	-0.00046	640.0876	-0.00194	640.1180	0.00281

Test Date : Dec. 03, 2013 Temperature : 22 °C Humidity : 60 %

B. Tx Frequency 652.1MHz

B1. Frequency stability versus enviroment tempture

Reference Frequency : 652.1 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.7Vdc	652.0873	-0.00194	652.0811	-0.00290	652.0938	-0.00095
40		652.0824	-0.00270	652.1142	0.00217	652.0809	-0.00293
30		652.0827	-0.00265	652.0757	-0.00372	652.0878	-0.00187
20		652.1212	0.00326	652.1135	0.00207	652.0895	-0.00161
10		652.1001	0.00002	652.0839	-0.00247	652.1008	0.00012
0		652.0979	-0.00033	652.1010	0.00016	652.0800	-0.00306
-10		652.0989	-0.00016	652.1060	0.00092	652.0753	-0.00379
-20		652.1171	0.00263	652.1052	0.00080	652.1083	0.00127
-30		652.0918	-0.00125	652.0854	-0.00224	652.1223	0.00341

B2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 652.1 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	3.145	652.1146	0.00224	652.1241	0.00370	652.1117	0.00179
25	4.255	652.1174	0.00267	652.1223	0.00342	652.1096	0.00148

Test Date : Dec. 03, 2013 Temperature : 22 °C Humidity : 60 %

C. Tx Frequency 663.9MHz

C1. Frequency stability versus enviroment tempture

Reference Frequency : 663.9 MHz Limit：0.005%							
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.7Vdc	663.9129	0.00195	663.8822	-0.00268	663.9196	0.00295
40		663.9198	0.00299	663.9113	0.00170	663.8969	-0.00046
30		663.9142	0.00214	663.8814	-0.00281	663.8874	-0.00190
20		663.9187	0.00281	663.9067	0.00101	663.9163	0.00246
10		663.9123	0.00186	663.8861	-0.00210	663.9140	0.00210
0		663.9101	0.00152	663.9105	0.00159	663.8779	-0.00333
-10		663.8939	-0.00092	663.8932	-0.00102	663.8959	-0.00061
-20		663.9061	0.00093	663.8881	-0.00179	663.9062	0.00093
-30		663.9122	0.00184	663.8957	-0.00064	663.9077	0.00115

C2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 663.9 MHz Limit：0.005%							
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	3.145	663.9229	0.00345	663.8746	-0.00383	663.9138	0.00209
25	4.255	663.8891	-0.00164	663.9237	0.00357	663.9119	0.00179

8 CONDUCTED EMISSION MEASUREMENT

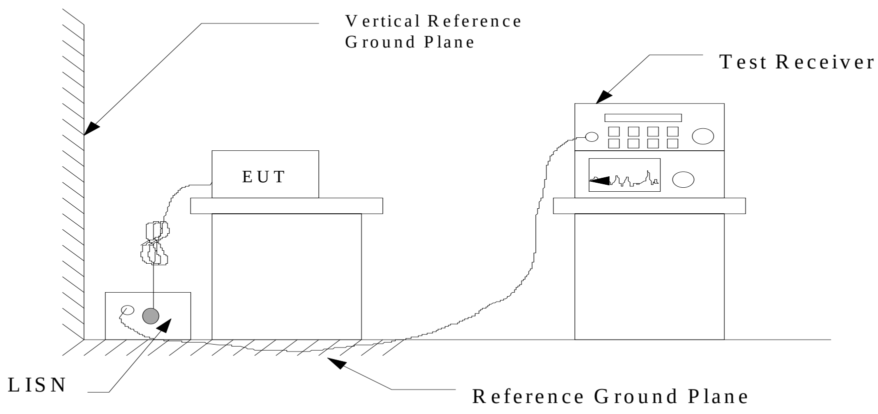
8.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to §15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

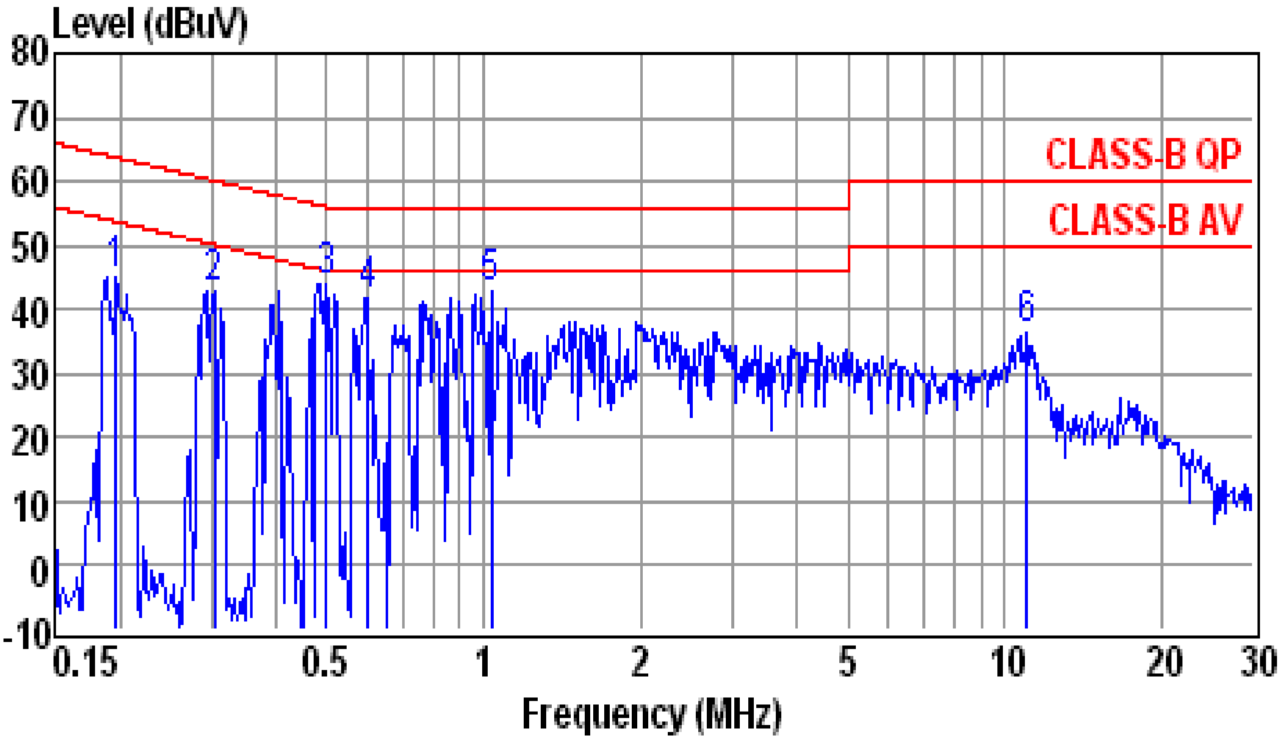
8.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



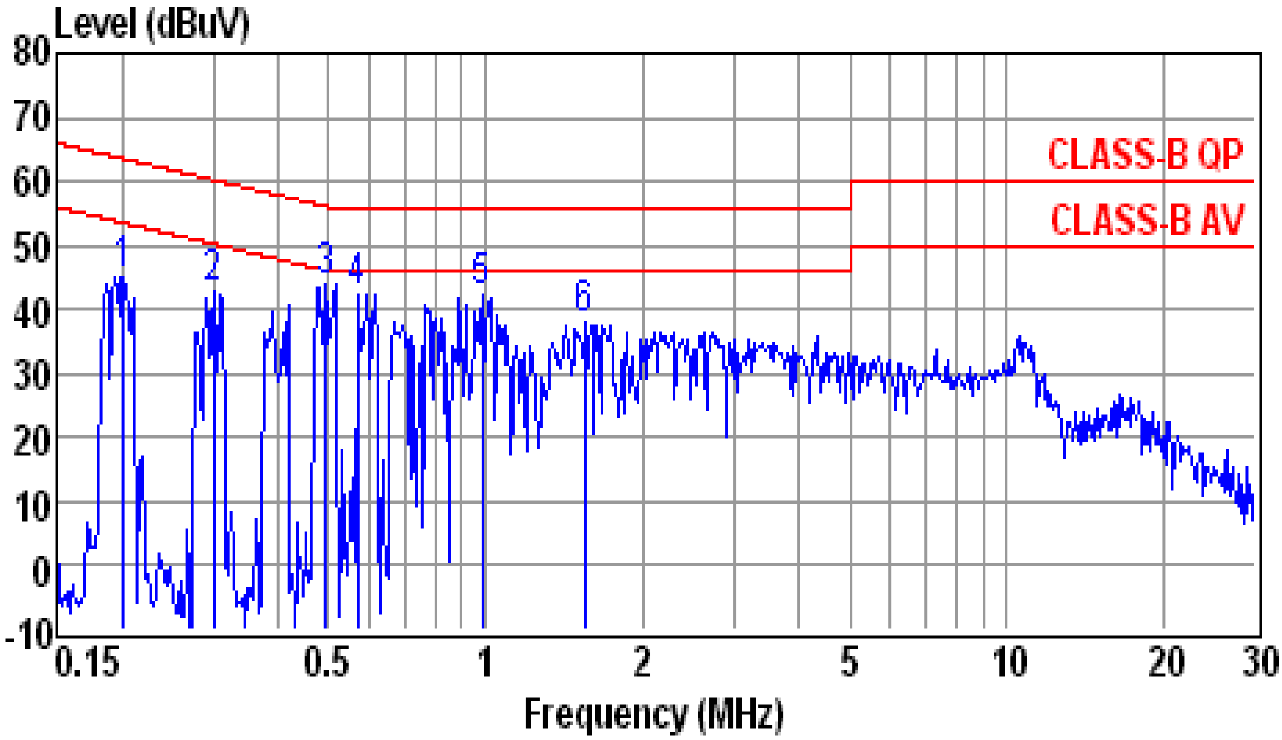
8.3 Conducted Emission Data



Site : conducted #1 Date: 12-02-2013
Condition : CLASS-B QP LISN: NEUTRAL
Tem / Hum : 25 ℃ / 60% Test Mode: CHARGE & OPERATION MODE
EUT :UHF Pendant transmitter
Power Rating :120Vac, 60Hz

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1965	44.9	0.1	45.0	63.8	-18.8	QP
0.3035	42.8	0.1	42.9	60.1	-17.2	QP
0.4994	43.9	0.2	44.1	56.0	-11.9	QP
0.5979	41.7	0.2	41.9	56.0	-14.1	QP
1.0320	42.5	0.2	42.7	56.0	-13.3	QP
11.0210	35.6	0.5	36.1	60.0	-23.9	QP

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site : conducted #1 Date: 12-02-2013
Condition : CLASS-B QP LISN: LINE
Tem / Hum : 25 ℃ / 60% Test Mode: CHARGE & OPERATION MODE
EUT :UHF Pendant transmitter
Power Rating : 120Vac, 60Hz

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.2018	45.1	0.1	45.2	63.5	-18.3	QP
0.3003	42.6	0.1	42.7	60.2	-17.5	QP
0.4941	43.8	0.2	44.0	56.1	-12.1	QP
0.5671	42.0	0.2	42.2	56.0	-13.8	QP
0.9839	41.9	0.2	42.1	56.0	-13.9	QP
1.5520	37.8	0.2	38.0	56.0	-18.0	QP

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

8.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dBμV is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dBμV.

RESULT = 22.5 + 0.1 = 22.6 dBμV
Level in μV = Common Antilogarithm[(22.6 dBμV)/20]
= 13.48 μV

8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2013/07/15	2014/07/14
LISN	EMCO	3625/2	2013/05/07	2014/05/06
LISN	Rohde & Schwarz	ESH2-Z5	2013/04/12	2014/04/11

8.6 Photos of Conduction Measuring Setup